

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : CANON INC

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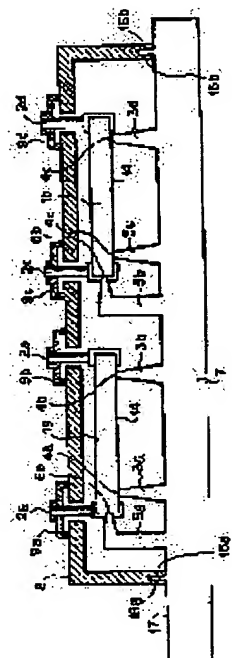
(72)Inventor : TAKANO HIROKUNI  
KONISHI TAKAYA

## METHOD FOR MOUNTING A PLURALITY OF MIRRORS

## Abstract:

**PROBLEM TO BE SOLVED:** To provide a projector and an optical instrument in which optical performance is improved by accurately reflecting the relative positions of a plurality of reflecting mirrors and fixing them in such a state.

**SOLUTION:** Reflecting mirror holding materials (2a to 2d) are bonded to reflecting mirror fixing materials (9a to 9d), and the reflecting mirror fixing materials (9a to 9d) are bonded to a reflecting mirror mounting member (8). After bonding, a reflecting mirror positioning tool (7) is removed to obtain a finished product. When the dimensional precision of the reflecting mirror mounting member (8) does not reach required accuracy or variability occurs. The relative motion in a Z direction of the lid-shaped reflecting mirror fixing materials (9a to 9d) and the boss-shaped part of the reflecting mirror holding materials (2a to 2d) absorbs the Z direction, and the relative motion in X and Y directions of lid-shaped reflecting mirror fixing materials (9a to 9d) and the reflecting mirror mounting member (8) absorbs the X and Y directions. The holding and the bonding of the lenses are carried out in a state where such a relative position relation is not broken.



## LEGAL STATUS

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IMS

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m(s)]

im 1] In the device on which said plural reflection mirror functions where it pasted up said plural reflection mirror  
 ie reflective mirror attachment member and a relative position is pasted up with a sufficient precision Decide a  
 ion for said plural reflection mirror with a fixture beforehand, and the mutual relative position is taken out with a  
 cient precision. The path clearance which can move freely between said plural reflection mirrors and said  
 hment members in order to absorb the variation in the dimension of said attachment member is secured. Two or  
 e mirrors means of attachment characterized by pasting up said plural reflection mirror, without breaking down the  
 ive-position relation of said plural reflection mirror even if there is variation in the dimension of said attachment  
 ber.

im 2] A boss configuration runs toward said attachment member from said plural reflection mirror. While inserting  
 -like member in said boss configuration which projected from a top and absorbing the variation in the dimension of  
 attachment member perpendicularly (Z direction) to the reflector of a reflective mirror by motion of the member of  
 hape of said lid, and said perpendicular direction (Z direction) of a boss configuration of duality They are two or  
 e mirrors means of attachment according to claim 1 characterized by absorbing horizontally (X, the direction of Y)  
 motion of said horizontal direction (X, the direction of Y) of a lid-like member and an attachment member of duality  
 e reflector of a reflective mirror.

im 3] two or more mirrors means of attachment according to claim 1 which make the condition of blockade the  
 rance between the joint sections of a lid-like member, the member of the shape of a boss configuration and a lid, and  
 tachment member to paste up, be always made to carry out member \*\*\*\*\*, and be characterize by lose deviation  
 ive position-related [ by the location gap produce by contraction of the adhesives in adhesion in the condition that  
 clearance opened between members ].

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## TAILED DESCRIPTION

### ailed Description of the Invention]

01]

technical field to which invention belongs] This invention relates to the approach of pasting up two or more reflective mirrors used for optical instruments, such as a front projector and a rear projector.

02]

scription of the Prior Art] In recent years, in an optical instrument, especially a rear projector, etc., the motion which uses engine performance projected on a screen, such as image quality and the quantity of light, is becoming active. engine performance of the image quality of a screen occupies the factor with the big engine performance of optical system. Taking out the relative-position precision of each reflective mirror with a sufficient precision especially, and fixing in the optical system using a reflective mirror, also especially is being greatly concerned with optical-character ability.

03] As shown in drawing 8, in case maintenance immobilization of two or more reflective mirrors is carried out, conventionally If immobilization of two reflective mirrors is taken for an example, will dash the reflective mirror A (1a) the reflective mirror B (1b) against a reflective mirror attachment member (8), and a location will be taken out. The is carried out in the condition that there is no clearance between a reflective mirror attachment member (8) and said reflective mirror, installation immobilization is carried out with UV hardening resin system adhesives, the adhesives of epoxy system, etc., and the relative-position relation of said reflective mirror is taken out as much as possible.

04] Next, with reference to drawing 9, the reason for having to take out the relative-position relation of said reflective mirror is explained. The assembly of the reflective mirror attachment member (8a) and reflective mirror attachment member (8b) which pasted up the relative-position relation of two or more reflective mirrors by the above-mentioned approach is carried out on the basis of positioning irregularity (24a, 24b). In the optical system of such configurations, the beam of light (23) emitted from the lamp (20) is reflected with a reflective light valve (19), each reflective mirror (1a, 1b, 1c, 1d) is reflected, it is reflected by the flat-surface reflective mirror 22, image formation is fixed out on a screen 21, and an image is seen on a screen.

05] It turns out that said reflective mirror (1a, 1b, 1c, 1d) uses the reflective mirror which raises optical-character ability, such as a free sculptured surface mirror, in many cases, and is very sensitive to the location of a reflective mirror, and the case where it will lead to degradation of optical-character ability if each other relative-position relation arises plentifully. Therefore, the precision of the relative position of said reflective mirror will be greatly concerned with the engine performance of the image of optics.

06]

blem(s) to be Solved by the Invention] However, to say nothing of being influenced by the precision of reflective mirror attachment material (8, 8a, 8b), the dimension variation of a reflective mirror attachment member (8, 8a, 8b) will lead into variation in the relative-position precision of said reflective mirror as it is, and the relative-position relation of said reflective mirror will appear. Of course, although what is necessary is just to carry out the means which raises the precision of a reflective mirror attachment member (8, 8a, 8b), and maintains the relative-position relation of said reflective mirror, raising the precision of a reflective mirror attachment member (8, 8a, 8b) leads to the rise of components cost as it is, and when mass-production nature is taken into consideration, the competitive strength of a product will be lost.

07] Then, this invention makes it the technical problem to offer the projector and optical instrument which raised optical-character ability by taking out the relative position of two or more reflective mirrors with a sufficient precision, carrying out adhesion in the condition.

08]

ans for Solving the Problem] In order to solve the above-mentioned technical problem, and to take out the relative position of a reflective mirror in this invention, it is made the structure where the relative-position relation of a plural reflection mirror is not affected even if it takes out the relative position of a plural reflection mirror with the fixture etc. , it gives path clearance to the part which pastes up a reflective mirror attachment member and a plural reflection mirror and a reflective mirror attachment member produces the variation in a dimension.

9] Therefore, a boss configuration runs toward an attachment member from a plural reflection mirror. Insert a lid-member in said boss configuration which projected from a top, and the variation in the dimension of an attachment member is absorbed perpendicularly (Z direction) by motion of a lid-like member and the Z direction of a boss configuration of duality to the reflector of a reflective mirror. To the reflector (14) of a reflective mirror, horizontally the direction of Y) X of a lid-like member and an attachment member, The condition of absorbing and blockading clearance between the joint sections of a lid-like member, the member of the shape of a boss configuration and a lid, an attachment member to paste up is made from a motion of the direction of Y of duality. It was made to carry out member \*\*\*\*\* of the part for jointing, and it has always lost deviation relative-position-related [ by the location gap induced by contraction of the adhesives in adhesion in the condition that the clearance opened between members ].

10]

[bodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 1 is a sectional view for explaining the process of the beginning of two or more mirrors means of attachment of this invention. the direction (parallel to reflector) positioning convex of X (5a --) in which the reflective mirror A (1a) and the reflective mirror B (1b) are formed from the reflective mirror positioning fixture (7) 5b, the direction (parallel to reflector) positioning convex of Y (not shown), It is constituted by each point 4a, 4b, 4c, 4d, 6a, 6b (the direction positioning convex point illustration of Y is not carried out) of a Z direction (it is perpendicularly reflector) positioning convex (3a, 3b, 3c, 3d) so that suction contact may be carried out exactly.

11] If the precision of a reflective mirror positioning fixture (7) has come out at this time, the relative-position relation between the reflective mirror A (1a) and the reflective mirror B (1b) will be kept good [ precision ].

12] As shown in drawing 6 , the reflective mirror A (1a) and the reflective mirror B (1b) are pasting up beforehand reflective mirror maintenance material (2b, 2c) by jointing (12a, 12b, 12c, 12d) of a reflective mirror and reflective mirror maintenance material at this time.

13] Next, as shown in drawing 2 , a reflective mirror attachment member (8) is arranged on the reflective mirror A (1a) which is maintaining the relative position by drawing 1 , and the reflective mirror B (1b). At this time, the precision search for has not come out or a reflective mirror attachment member (8) can consider the variation in a dimension

14] Therefore, as shown in drawing 7 , the path clearance (13a, 13b, 13c, 13d) of a reflective mirror attachment member (8) and reflective mirror maintenance material (2a, 2b) is needed.

15] Next, as shown in drawing 3 , a lid-like reflective mirror bridging (9a, 9b, 9c, 9d) is put from reflective mirror maintenance material (2a, 2b, 2c, 2d). At this time, toward the reflective mirror attachment member (8), a boss configuration runs through reflective mirror maintenance material (2a, 2b, 2c, 2d), and it has the structure of inserting a reflective mirror bridging in the boss configuration which projected.

16] Moreover, a reflective mirror attachment member (8) carries out fitting of the positioning concave (16a, 16b) which are a part of configurations of a positioning boss (15a, 15b) and a reflective mirror attachment member (8) which is a part of configuration of a reflective mirror positioning fixture (7), and he is trying to decide the location of the horizontal X of a reflector (14), and the direction of Y. Moreover, he decides the location of the Z direction of the perpendicular direction of a reflector (14), and is trying to decide the location to a reflective mirror positioning fixture by dashing the Z direction thrust reliance side (17) of a reflective mirror attachment fixture (7), and the Z direction thrust reliance side (18: illustrating to drawing 4 ) of a reflective mirror attachment member (8).

17] And as shown in drawing 6 , adhesion of reflective mirror maintenance material and a reflective mirror bridging is performed by jointing (10a, 10b, 10c, 10d), and adhesion of a reflective mirror bridging and a reflective mirror attachment member is performed by jointing (11a, 11b, 11c, 11d).

18] Next, if adhesion finishes as shown in drawing 4 , a reflective mirror positioning fixture (7) will be removed and will consider as a finished product.

19] Have not reached the precision which the dimensional accuracy of a reflective mirror attachment member (8) reaches for by taking the above configuration, or When variation arises, as it is shown in drawing 5 and drawing 6 , a Z direction is absorbed by motion of the Z direction of the boss configuration section of a lid-like reflective mirror bridging (9) and reflective mirror maintenance material (2) of duality. X and the direction of Y are made to carry out maintenance adhesion, absorbing by motion of X of a lid-like reflective mirror bridging (9) and a reflective mirror

achment member (8), and the direction of Y of duality, and not breaking down relative-position relation as it is.

0] If the path clearance (13a, 13b, 13c, 13d) of a reflective mirror attachment member and reflective mirror tenance material is filled up with adhesives and it fixes to it when there is no reflective mirror bridging (9) as vn in drawing 7 , a reflective mirror will be pulled by the reflective mirror attachment member by contraction of sives, and a related dimension will collapse.

.1] As shown in drawing 6 , in order to abolish this fault, the reflective mirror bridging (9) was attached, the path rance of jointing (10a, 10b, 10c, 10d, 11a, 11b, 11c, 11d) was lost, and the deviation of the location dimension by raction of adhesives is lost.

.2]  
ect of the Invention] According to this invention explained above, it can fix, maintaining a relative position without thout relative-position immobilization of two or more reflective mirrors is influenced by contraction of adhesives, ] being influenced by the dimensional accuracy of the attachment member of a reflective mirror.

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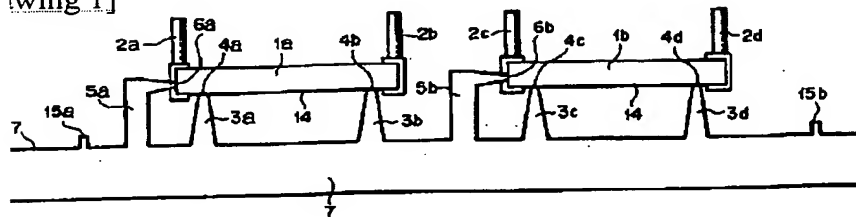
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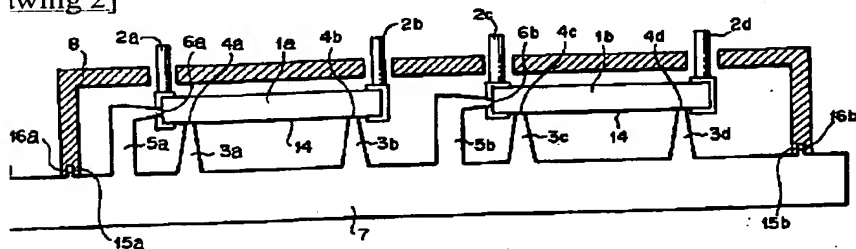
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## DRAWINGS

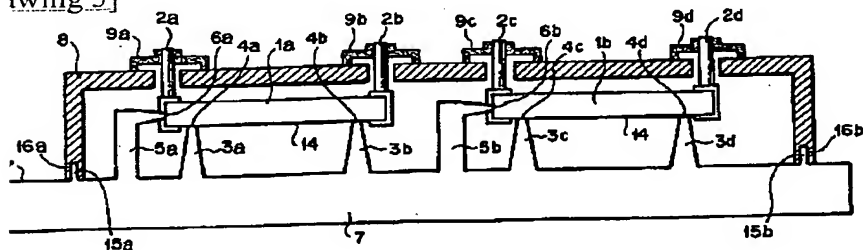
[Drawing 1]



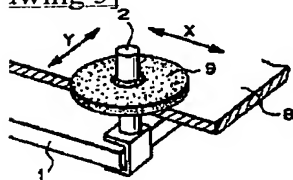
[Drawing 2]



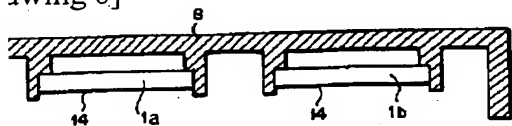
[Drawing 3]



[Drawing 5]

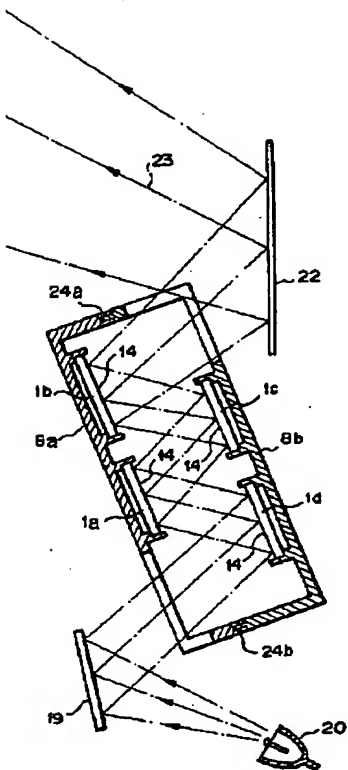


[Drawing 8]

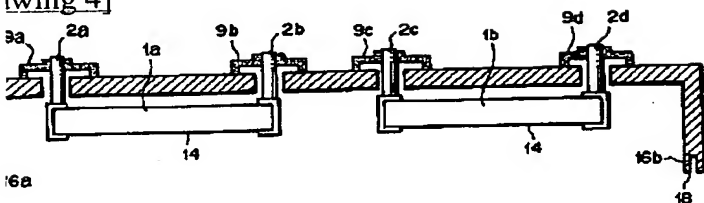


[Drawing 9]

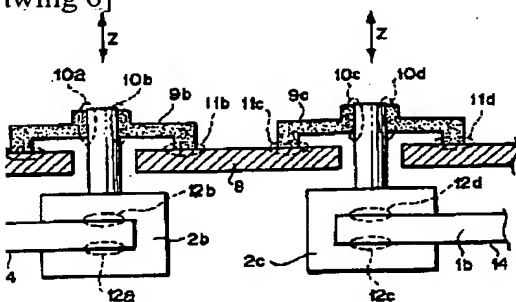
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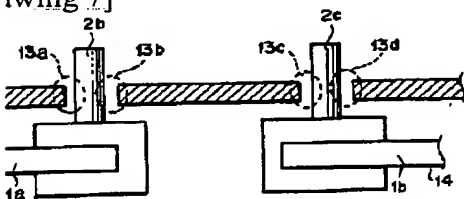
wing 4]



ewing 6]



wing 7]



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